

REMARKS

Claims 1-20 are pending in the application. Claims 1-18 have been rejected and claims 19-20 have been objected to.

Claim Rejections – 35 USC § 102

Claims 1, 6-14 and 16 have been rejected under 35 U.S.C. 102(b) as being anticipated by Jacobson et al. (U.S. Patent No. 5,503,840).

The present invention is directed to a method of producing plastic products that exhibit satisfactory antimicrobial activity. In order to achieve this objective, the intermediate product (e.g. an inorganic compound such as barium sulfate) is treated with an antimicrobial *colloidal* metal (see step B) and additionally a readily or sparingly soluble salt of an antimicrobial metal is added to the intermediate product (see step C).

It is respectfully submitted that Jacobsen does not teach a treatment of the intermediate product with a colloidal antimicrobial metal, and additionally does not teach separate addition of a sparingly or rarely soluble antimicrobial metal salt to the intermediate product prior to forming an antimicrobial product.

The Examiner argues that:

while Jacobson never calls the coating a colloid, the “coating” is created by reduction of a metal salt solution of silver nitrate with sodium nitrate (col. 10, lines 44-51). Applicant describes the metal colloid to be prepared by reduction of metal salt solutions [0020], which is exactly how the silver coating is prepared in Jacobson. Even if the coating comprises “a total surface coverage,” as Applicant describes, the coating is colloidal.”

See page 6 of the Final Rejection.

Accordingly, the Examiner acknowledges that Jacobson does not mention the use of metal colloids. However, he argues that Jacobson’s process silver formation (see examples 1-5) would be identical to the process of silver formation of the present invention. Therefore, Jacobson would implacably disclose colloidal silver, thus anticipating the present invention.

As shown below, this is not the case, since Jacobson’s process does not produce colloidal silver.

The present invention relates to a method of producing an antimicrobial product, comprising under step B) “treating at least one constituent of an intermediate product with an antimicrobial colloidal metal” (preferably colloidal silver, see claim 14). The colloidal metal is obtained by reduction of metal salt solutions (see 0020 and example 2A), and is then adsorpted onto a solid such as barium sulfate.

In contrast, Jacobson’s process involves no adsorption of colloidal silver, but the precipitation of silver hydroxide on barium sulfate, which is subsequently reduced to obtain macroscopical silver.

It should be noted that an adsorption (see present invention), means a deposition of a (colloidally) suspended solid component onto another solid, while a precipitation (see Jacobson) includes a phase transition from the dissolved state to the solid state. However - as disclosed by the present invention – a colloidal metal can be obtained by reduction of a silver salt solution, thus rendering a suspension of colloidal silver that is subsequently adsorpted onto a solid.

Accordingly, Jacobson’s process differs from the present invention in two major aspects. Firstly, Jacobson does not reduce a metal salt solution but a precipitate of silver hydroxide on barium sulfate. This is because Jacobson first precipitates silver hydroxide (onto barium sulfate) and subsequently reduces the precipitated silver hydroxide (AgOH) on the barium sulfate in order to obtain a coating of macroscopical silver (see examples 1 to 5). Secondly a precipitation occurs but no adsorption.

In more detail, Jacobson’s examples 1 to 5 describe the following steps:

- 1) Formation of barium sulfate slurry
Addition of barium sulfate powder to distilled water under stirring to obtain a smooth slurry
- 2) Precipitation of solid silver hydroxide (not silver) onto barium sulfate
Slow addition of a solution of silver nitrate in distilled water – during this addition an approximately 20% NaOH solution was added dropwise to the slurry to control the pH between 8.5 and 9.0
- 3) Reduction of AgOH to Ag (layer a)
NaNO₂ that was dissolved in water was added to the stirred slurry to cause reduction of Ag⁺ (i.e. AgOH) to Ag
- 4) Precipitation of copper salt (Layer b)

Addition of $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$ in distilled water to the stirred slurry upon controlling pH at 8.2 with NaOH solution.

- 5) Precipitation of protective coating from K_2SiO_3 solution (Layer c)
- 6) Precipitation of dispersion coating from Al_2O_3 (Layer d)

Accordingly, in Jacobson's above step 2) silver hydroxide (and not silver) is precipitated onto the barium sulfate. Due to the agglomeration the precipitate of silver hydroxide is not a colloidal one, but a macroscopical one. In the subsequent step 3) the reduction of said macroscopical silver hydroxide precipitate is effected by using NaNO_2 as a reduction agent, thus rendering a macroscopical silver coating (Jacobson's Layer a) on the barium sulfate. Said macroscopical silver coating ensures substantially total surface coverage of the barium sulfate core particles, and this is exactly what Jacobson intends to produce (see column 4, lines 34-37).

It is respectfully submitted that Jacobson neither in the description nor in the working examples discloses explicitly or implicitly colloidal silver, which is a constituent feature of the presently claimed invention. Accordingly, the present claims are not anticipated by Jacobson.

Claim Rejections – 35 USC § 103

Claims 2-5, 15 and 17-18 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson et al (U.S. Patent No. 5,503,840), as applied to claim 1 (for claims 2-5 and 18) and claim 16 (for claim 17) above, in view of Terry (U.S. Patent No. 6,716,895).

The Examiner argues it would have been

obvious to combine the teachings of Jacobson and Terry to create an article that had both surface antibacterial properties (Jacobson), due to the metal colloid, and a radius of antibacterial properties (Terry col. 8 line 23), due to the release of ions from the metal salt colloid.

See page 7 of the Final Office Action.

The Examiner's reasoning is based on the assumption that Jacobson discloses colloidal silver. As shown above Jacobson does not disclose colloidal silver. Also Terry does not disclose colloidal silver, (which is not asserted in the outstanding Office Action).

Moreover, neither Jacobson nor Terry gives any hint to use colloidal silver. Neither references gives a hint to use colloidal silver in order to solve the problem of the present invention, which lies in the provision of an antimicrobial plastic product exhibiting satisfactory immediate and long-term action against microorganisms. Notably, Terry intensively discusses

the drawbacks of using metallic silver (see column 1, line 25 to column 2, line 38), and therefore teaches away from the present invention.

It is respectfully submitted that the combined teaching of Jacobson and Terry does not render the present invention obvious. Accordingly, the application is in condition for allowance.

CONCLUSION

In view of the above remarks and amendments, it is respectfully submitted that the foregoing is fully responsive to the outstanding Office Action. Early favorable consideration of the above application is earnestly solicited. In the event that a phone conference between the Examiner and the Applicant's undersigned attorney would help resolve any issues in the application, the Examiner is invited to contact said attorney at (651) 275-9811.

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By:

Respectfully Submitted,



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